



## IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants : Jeffrey Morse et al Docket No. : IL-10634  
Serial No. : 10/007,412 Art Unit :  
Filed : December 5, 2001 Examiner :  
For: A Chemical Microreactor and Method Thereof

**Commissioner for Patents**  
**Alexandria, VA 22313-1450**

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PATENT

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PETITION TO MAKE SPECIAL UNDER 37 C.F.R. SECTION 1.102 (c)

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

The applicant hereby petitions, pursuant to 37 CFR 1.102 (c), that the subject patent application be accorded "special" status and be advanced to an early examination based upon material contribution of the subject invention to enhancement of the environment and conservation of energy resources.

The invention claimed in this application relates to highly efficient chemical microreactors. As noted in the application, the microreactors of the invention are suitable for use in steam reforming or partial oxidation of hydrocarbons, in particular methanol, to produce hydrogen for fuel cells, so that the combination of a chemical microreactor and miniature thin-film fuel cell is a particularly efficient portable power source, such as for portable electronic devices. The development of effective fuel cells and systems is an important part of implementing a "hydrogen economy." The invention provides a highly scalable, efficient and inexpensive design and fabrication technique for a microreactor/hydrocarbon reformer that can be used with a miniature fuel cell to supplement or replace conventional portable power sources that are generally less energy and resource efficient, such as battery cells. Availability and wide use of such miniature

fuel cell power sources should have a material impact on the environment and energy resources of this country.

It is believed that the present invention will materially enhance quality of the environment for several reasons. First, miniature fuel cell power sources do not include toxic heavy metals such as cadmium and lead found in some other commercially important portable power sources, such as many primary and rechargeable batteries. Second, miniature fuel cell power sources have a much longer operating lifetime than conventional battery cells. By some estimates, as many as two billion batteries are sent annually to landfills in the United States. This represents a significant volume of solid waste and with a significant toxic content, since many conventional batteries contain heavy metals such as cadmium and lead. The development of suitable miniature fuel cell power sources for portable electronics will supplant the use of conventional battery power sources for at least a portion of the portable electronic power source market. This will result in a smaller and less toxic amount of solid waste from discarded power sources associated with the use of portable electronic devices.

An additional benefit to the environment is that miniature fuel cell power sources in accordance with certain embodiments of the invention described and claimed in the present application use methanol as a fuel that is reformed and/or partially oxidized to provide hydrogen to the fuel cell. Methanol is a biofuel that can be obtained from fermentation of organic waste materials and from methane released into the environment from petroleum processing, landfill and waste disposal sites, for example. The proliferation of miniature fuel cell power sources in accordance with the invention could increase demand for methanol and render the use of biofuels, such as methanol, more attractive, thereby reducing greenhouse gas emissions and reliance on imported fossil fuels.

It is also believed that the invention will materially contribute to the development and/or conservation of energy resources. Fuel cells have very high power densities; they make very efficient use of fuel. If the microreactor technology of the present application provides the needed impetus for the development and wide-scale deployment of

miniature fuel cell power sources for portable electronic devices, the concomitant energy efficiency will result in conservation of energy resources relative to conventional power sources for portable electronic devices.

I declare that all statements made herein of my own knowledge are true; that all statements made on the information and behalf are believed to be true and further that these statements made with the knowledge that willful false statements are punishable by fine or imprisonment, or both under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Dated: 2/15/04

  
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Ann M. Lee  
Reg No.: 47,741

Tel. No.: (925) 424-6897  
P.O. Box 808, L-703  
Livermore, CA 94551